

AD-A262 165

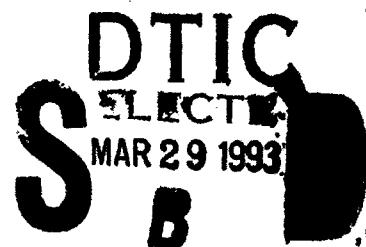
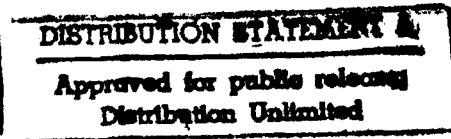
(2)

1992
Executive Research Project
RS 10a

The Japanese/German Lesson: Opportunities for United States Industrial Strategy

Martin J. Boivin
U. S. Coast Guard

Faculty Research Advisor
Dr. Robert E. Lyons



The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-6000

93-06284



98 3 26 066

SSPA

ADDRESS (City, State, and ZIP Code) Fort Lesley J. McNair Washington, D.C. 20319-6000		7b. ADDRESS (City, State, and ZIP Code) Fort Lesley J. McNair Washington, D.C. 20319-6000			
NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)			
9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER					
ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS			
		PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.
TITLE (Include Security Classification) <i>The Japanese/German Lesson: Opportunities for U.S. Industrial Strategy</i>					
PERSONAL AUTHOR(S)					
a. TYPE OF REPORT Research	13b. TIME COVERED FROM Aug 91 TO Apr 92		14. DATE OF REPORT (Year, Month, Day) April 92		15. PAGE COUNT 56
SUPPLEMENTARY NOTATION					
COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
ABSTRACT (Continue on reverse if necessary and identify by block number)					
SEE ATTACHED					

THE JAPANESE/GERMAN LESSON: OPPORTUNITIES FOR U.S. INDUSTRIAL STRATEGY

Abstract:

How can we prepare to meet the changing threat to our national security? While the United States concentrated on military containment of the Soviet Union, attention was diverted from our declining industrial base and from our decreasing ability to compete in the global economic arena. Our national security increasingly depends upon our ability to recapture our economic vitality. This requires a reevaluation of the role of government in the marketplace.

Japan and Germany display an awareness of what it takes to compete globally. Their economies are export oriented and feature a high degree of government-industry-labor cooperation. Their governments have been successful in defining a sense of common purpose and in creating an environment in which their industries have flourished. Through leadership and incentives to industry, these two governments have enabled their industries to become more competitive.

Our industries are at a disadvantage in competing against the increasing number of foreign government-industry-labor partnerships. It is time to rethink our government's role in developing an industrial strategy. This paper presents a framework through which we can increase our industrial competitiveness and meet the challenge of the global marketplace.

**Martin J. Boivin
10 April 1992**

1992
Executive Research Project
RS10a

The Japanese/German Lesson: Opportunities for United States Industrial Strategy

Martin J. Boivin
U. S. Coast Guard

Faculty Research Advisor
Dr. Robert E. Lyons



The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-6000

DISCLAIMER

This research report represents the views of the author and does not necessarily reflect the official opinion of the Industrial College of the Armed Forces, the National Defense University, or the Department of Defense.

This document is the property of the United States Government and is not to be reproduced in whole or in part for distribution outside the federal executive branch without permission of the Director of Research and Publications, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C. 20319-6000.

DTIC QUALITY INSPECTED 1

Accession Ref	
NTIS GRA&I DTIC TAB Unannounced Justification	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
X	

THE JAPANESE/GERMAN LESSON:
OPPORTUNITIES FOR U.S. INDUSTRIAL STRATEGY.

INTRODUCTION:

The world has changed while we were looking the other way. Our national security increasingly depends on our ability to meet the economic challenges of the evolving global marketplace. Our ability to meet pressing domestic needs, to maintain a sufficient military capability, and to ensure that we have the resources to help developing nations depends on sustained economic growth. We are facing global competitors who increasingly rely on a government-industry-labor partnership to coordinate economic direction. How well suited are we to meet this level of increased competition?

The MIT Commission on Industrial Productivity reported that the American economy exhibits a lower level of cooperation among business, government, and labor than our major competitors.¹ To meet the global challenge, our strategy has been to seek less government involvement by other countries in support of their industries. This strategy does not seem to be working. International agreements take time, and when they are successful must contain compromises which lessen their effectiveness. In the meantime, other governments continue to support their industries, while our industries continue to lose competitiveness.

Our national security depends upon a strong growing economy. Our industrial base must be competitive to prosper in the increasingly interdependent international arena. It is time to consider an alternative strategy to revitalize our industries. Japanese and German governments maintain differing levels of government involvement in directing and

assisting their industries. Both have been successful in providing the leadership, incentives, and focus for their economies. Their actions have demonstrated what it takes to be successful in today's global market.

They have been successful in establishing and maintaining export-focused economies based on a cooperative environment among government, industry, and labor. They have used government incentives to encourage technological innovation and investment in equipment and human resources, and to increase product quality. Their governments have taken policy actions which recognize and complement industry's needs to develop long-term strategic plans to maintain global competition.

I will explore the current state of United States competitiveness, look at Japan's and Germany's industrial policies, and present a framework for development of an industrial strategy for the United States.

BACKGROUND:

Has the United States won the battle but lost the war? For forty-six years, the United States has been consuming resources and human energy while pursuing a policy of containment towards the Soviet Union. Those connected with democracy and the free-market system watch with a sense of satisfaction, believing that individual choice in government and in the marketplace is more powerful than state-controlled systems. But wait! Is the winner supposed to look like this?

In 1945, at the start of the Cold War, the U.S. was undoubtedly the most powerful military and economic power in the world. Japan and Germany had been defeated. The Soviet Union was a military power with a small but growing economy. Today, the United

States is still the largest economic and military power in the world. Yet our economic domain is showing signs of neglect.

We are in a period of extended recession in which monetary and fiscal response is handicapped by the budget deficit and by our lack of economic focus. We have a national debt -- fueled by 21 consecutive years of deficit spending -- of over 3 1/2 trillion dollars.² Fifteen percent of our annual budget must be spent just to service the debt. We have maintained an average annual trade imbalance of over 50 billion dollars per year for the last seven years, which is a further drag on our economy.³

We have experienced a very visible decline in the global competitiveness of our automobile, steel, semi-conductor, and consumer electronics industries. Our leadership is also being threatened in other leading technological sectors.

The per capita GDP is greater in Japan and Germany than in the United States.⁴ Our actual and forecasted industrial production growth rate has been less than Japan and Germany since 1988.⁵ We have experienced a steady decline in our productivity advantage over the Group of Seven since the late 1970's.⁶ Our growth in productivity, a crucial indicator of industrial performance, has averaged only slightly more than 1 percent per year since the 1970's.⁷ This lagging productivity will eventually stop our rising standard of living and could lower our real wage rates which have been a prime accomplishment of the U.S. economy.

Political and military power depend on economic vitality. Weakness in the United States production system will inevitably raise doubts about our nation's ability to retain its influence and standing in the world.

Our preoccupation with containing the Soviet threat has left us economically wounded. Failure to maintain our industrial and technological edge could lead to greater protection of our domestic industries. We are already hearing cries for fairness in the form of tariffs. Restricted trade will lead to increased friction worldwide. Our national interest must be in global free trade. The emerging East European and Third World countries, not to mention the republics of the former Soviet Union, must have a world economic climate that will permit growth for everyone. Democracy depends on it.

This nation's defense industrial base is irrevocably interlocked with its overall industrial capacity. Concern for the decline in the defense industrial base was recognized in the early 1980's.⁸ Increased defense spending during this period tended to mask the reduction in numbers of suppliers and subcontractors, and the increased dependence on foreign sources for defense system components. It also masked the fact that our commercial industries were losing their competitiveness and technological leadership.

The end of the Cold War, disintegration of the Soviet military threat, and the resulting defense budget cuts will further reduce the defense industry base. In addition, the increased budget deficit has significantly reduced the fiscal options available to revitalize our industries and to maintain an adequate defense.

The defense cutbacks and a revised strategy toward a smaller base force may result in an industrial capacity so low that it won't be able to mobilize sufficiently in time of war. Likewise, foreign dependency has undesirable risks. It allows others to influence our political decisions by refusing to furnish needed supplies. The independence to respond in one's own national interest is hindered.

The political realities of the current global military situation, the growing deficit, and the competing domestic needs will continue to put pressure on further defense cuts. This will result in:

- Fewer companies able and willing to furnish defense needs.
- Fewer industry investments in R&D and capital improvements.
- Higher unit costs for defense acquisitions.
- Reduction in the number of government funded laboratories and research grants.
- Loss of technically capable researchers and production personnel.

As can be seen from the list, the overall quality and capacity of our defense capability will be degraded. The diminishing ability of the national budget to fund defense and domestic needs means we must maximize the utilization of available resources. Defense industry needs must be -- to the maximum extent possible -- incorporated into a strong commercial industry. The defense department will have to rely increasingly on commercial innovations and manufacturing flexibility for many of its needs.

The components of the defense industry are diverse and represent all segments of American manufacturing. A study of the economic performance of the defense industries indicates a performance parallel to the non-defense sector.⁹ A strategy that improves the performance of non-defense industries should also benefit defense industrial capabilities. Likewise, industrial strategies which result in growth in manufacturing should also result in economic prosperity for the entire nation. More resources would then be available for defense and for other national security needs.

In our pluralistic-political environment, timing is everything. Industrial policy has been attacked because it is perceived as government control of the free market and as government selection of "winners and losers." But, industrial policy comes in many packages. A discussion of industrial policy might serve no other purpose than to focus government and industry attention on strategy alternatives, and thus act as a catalyst for cooperation. As the public realizes our standard of living has lowered, and as they feel the impact of fewer well-paying jobs, increased political pressure will be applied for an "industrial policy."

The United States must compete in the global economic market. If other countries support their industries, can our industries compete on an equal footing? There is widespread realization that American industrial competitiveness is lacking. This, coupled with the further erosion of our defense capability and with our stalled economic growth, calls for a new look at industrial strategies for America.

The two industrialized countries that have rebuilt their economies since World War II -- Japan and Germany -- will serve as a study base to determine strategy opportunities for the United States. It is time to revitalize American industry!

JAPAN'S ECONOMIC LESSON

MITI'S INDUSTRIAL POLICY:

Japan's economic growth has been phenomenal. Its economy has risen from the ruins of World War II to achieve Super Power status. This growth has been credited -- to a large extent -- to a government agency, the Ministry of International Trade and Industry (MITI), and to their industrial policy. Are there policy implications for the United States?

MITI's impact on the economic success of Japan has been the subject of continuing debate. I will not attempt to evaluate the relative importance of MITI, but rather to present the aspects of its industrial policy which I feel have contributed to Japan's economic development and growth.

MITI's significant contributions to Japan's economic success are:

- Providing the vision, strategy, and leadership necessary to push/pull Japan's industries.
- Utilizing consensus building among industry leaders, government politicians, and other bureaucrats to obtain policy objectives.
- Utilizing government tax initiatives to support selected industries and R&D efforts.
- Conducting government subsidized joint research projects and using national interest and pressures to avoid anti-trust suits.
- Permitting the formation of cartel-like companies organized around banks.
- Maintaining flexibility in administering policy by use of "Administrative Guidance."

- Encouraging government and industry policy for savings and education.
- Ensuring capital investment incentives are available for expansion.
- Providing situational leadership by varying its level of industrial involvement based on current and longtime need.

Japan's limit on natural resources creates the need for a strong export-driven marketplace. MITI realized that it was necessary to maximize the value of exports relative to imports. This meant concentrating resources on industries with the larger increase in the value added to products during manufacturing. Therefore, MITI developed industrial targeting which directs resources to help domestic producers in selected industries become more competitive. The U.S. International Trade Commission defined targeting as involving four basic elements: 1) government initiatives to compensate for market failures; 2) selecting certain industries for preferential treatment; 3) preferential allocation of finite resources, and 4) enhancing the competitiveness of domestic producers.¹⁰ In Japan, economic growth is an important component of national security. Industrial performance with a focus on production and a dominance of key industries enhances its strategic position.¹¹ According to MITI, technology is the driving force for social and economic development.¹²

MITI VISIONS:

You don't know if you are on the right road unless you know where you want to go. MITI expends a great deal of effort developing annual, medium, and long-term economic forecasting and goal setting. MITI's industrial policy means programs to promote growth, efficiency, prosperity, or occasionally, the orderly decline of specific industries. More often than not, the goal is export expansion.

There are about two hundred industry-advisory councils that do long-range planning. Most of the councils report to MITI. In addition, there are over one hundred major industry associations that engage in long-range planning. These associations act as funnels for information flow between business and government, help to organize the transfer of foreign technology to Japan, and represent their industry in formal and informal negotiations with government. Industry associations and councils constantly negotiate policies, programs, and means of execution. This is where the initial government policies first take shape. From here, the policies are negotiated with other government ministries.

POWER OF THE BUREAUCRATS:

The relationship among the politicians, bureaucrats, and business leaders is complementary and differs from traditional relationships. Each of Japan's ministries is headed by political appointees (minister and vice-minister) of the ruling party. The head bureaucrat is the administrative vice-minister, also appointed. Japan's liberal Democratic Party (LDP) has been in office since 1947. This has provided consistency in relationships among the politicians, the bureaucracy, and business. The roles have evolved so that the bureaucrats wield the most power in the political-bureaucratic-business triangle. LDP legitimizes the work of the bureaucracy and ensures that policy does not veer beyond public tolerance. The bureaucracy guides industry towards developmental goals and ensures support from the politicians. Business provides financial support to keep the politicians in office, although it doesn't achieve control of the party. Rather, the politicians tend to support the bureaucracy over their financial contributors.

The government bureaucrat thus wields considerable power and receives hierarchical respect in Japanese society. Considering the cultural desire to establish a position in a

group hierarchy, it should not be surprising that MITI -- along with other government ministries -- attracts Japan's best college graduates. Japan's college students must take a rigorous civil service examination to enter government service. In 1989, only four percent of the 12,000 tested passed the examination. MITI usually takes 26 or 27 college graduates each year -- 80% of them from Tokyo University and almost all of them men.¹³ Seniority at MITI is so strict that bureaucrats refer to their colleagues, hired at the same time, as classmates. The classes progress up the seniority ladder and face a series of "weeding out" processes, until at around age 55 a single class member is elevated to the top bureaucratic position in MITI, administrative vice-minister. When a class member reaches this vice-minister position, his classmates must resign. The vice-minister only serves one year. Upon promotion, he is responsible for finding employment for his classmates in private industry. Likewise, he is assured a board position at a major corporation when he resigns. The Japanese move from government to industry is called amakudari, "descent from heaven."

The classmates maintain an "old boy network" throughout their careers. This helps perpetuate the closeness of industry and government, and makes communication, consensus building, and policy execution that much easier.

GOVERNMENT SUBSIDIES AND INCENTIVES:

MITI implements some of its desired policy objectives by utilizing tax incentives to assist and encourage specific industries. In new industries, it utilizes import tariffs and quotas to protect desired growth and product development.¹⁴ Many policies result in higher domestic pricing as a source of financing industrial output.¹⁵ In the petroleum industry, the government maintains higher consumer pricing of gasoline as a means of compensating

refineries for lower fuels costs for industries.¹⁶ MITI's stature with special interest groups and with the LDP make implementing these policies easier and more effective.

MITI has recently focused industrial policy on high technology industries, based on the premise that the market mechanism alone would not ensure an adequate supply of and demand for technology. They believe that the market would not offer sufficient returns -- compared to the risks -- to firms that develop new technologies. It thus subsidizes research and development, and encourages joint research projects between private enterprises.¹⁷ Whereas, the U.S. provides more R&D money than Japan, the U.S. emphasis has been on defense uses while Japan has concentrated on commercial applications. Japan has used its R&D subsidies very effectively in lowering industry's competitive costs. When Japan was forced to lower tariff costs in the 1970's, government subsidies for R&D rose dramatically. It is probably a more efficient use of funds than tariffs in any event.

MITI utilizes tax incentives to encourage capital investment. Corporations, not feeling the pinch for short-term profits, have responded significantly. 1990 marked the fourth year in a row that Japan has out-paced the United States in capital spending.¹⁸ Only a third of Japan's capital investment is going into adding capacity -- the usual source for capital expenditures; the other two-thirds are going into expanding productivity and developing new products.¹⁹

LENIENT ANTI-TRUST LAWS HELP:

Lenient anti-trust laws and enforcement have added to MITI's flexibility in promoting competitive pricing of exports. MITI has orchestrated joint research, development, and marketing in robotics and computers. The government paid for one-third of the project's cost with participating industries funding the remainder. The

government also backed a plan whereby firms interested in testing industrial robots, before committing themselves to an expensive purchase, could lease the robots.²⁰ As a result, sales of robots have markedly increased.

Perhaps MITI's largest impact on industry was generated by its historic concern for an overabundance of competing firms. In 1953, it pushed through the Reorganizational Council, the consolidation of companies into groups.²¹ This grouping placed trade companies and manufacturers under the control of a bank Keiretsu. This had the effect of reducing 2,800 trading companies -- which had existed under the occupation -- down to 20 larger companies, each serving a bank. This, as it turns out, had more to do with consolidating MITI's ability to exercise power than any other policy action. Not only did they have fewer companies to work with, but it gave the government another means of control.

The banking connection, coupled with the eventual high degree of industry debt leverage, resulted in the Keiretsus being more dependent on the Central bank, and thus, on the government. This, coupled with MITI's power within government, increased their ability to attain industry cooperation.

MITI practices also encouraged coordination between Keiretsus. This has led to intertwined ownership, which has promoted cooperative business dealings and cross ownership. This multiple ownership within and across Keiretsus structurally encourages the Japanese to transact business among themselves. It is a major obstacle for foreign companies conducting business in Japan. This common ownership has also created a barrier to unfriendly takeovers.

You might conclude that the Keiretsu would be an impediment to competitiveness. Yet, if you realize that foreign market share is the ultimate goal, internal competition is quite possible. In fact, MITI has intervened to reduce detrimental competition between Keiretsus.

The Keiretsus and MITI have emphasized long-term growth and capital investments. They have also concentrated on lowering product cost and on increasing trade and global market share.

ADMINISTRATIVE GUIDANCE, SAVINGS, AND EDUCATION:

MITI has achieved much of its success through information sharing, common goal setting, and perceived power in both government and industry. It has not had to pass detailed regulatory policies. When legislative authorization is required, it will pass laws which contain only broad outlines of desired results. It will use its position of power through a technique called "Administrative Guidance" to achieve the desired results.²² This ability keeps its hands from being tied by strict legislation and gives it the flexibility to adjust direction as it desires.

MITI has pushed two additional actions necessary for industrial growth. It has worked with other government agencies to ensure that the national savings rate is sufficient to finance capital investment and to ensure that its work force is adequately educated. The Japanese savings rate is the highest in the world. This is in part due to an innovative postal savings plan and to its tax-based incentives.²³ The Japanese receive tax credit for interest earned, but no credit for interest paid.²⁴ Before recent changes in the Tokyo Stock Market, interest rates were approximately three percent in Japan as compared to nine percent in

the United States.²⁵ This has provided a major funding source for Japan's highly leveraged industries.

The Japanese have also concentrated on developing a technically trained workforce. In 1980, with a population one-half the size of the United States, Japan graduated more engineers than the U.S.: 73,500 vs. 69,300.²⁶ There is another important distinction in the educational orientation. Most Japanese companies have extensive training programs. These programs emphasize commercial application of technology, productivity, and quality improvements. Improvements in quality are an integral part of the Japanese focus in manufacturing. Aiko Morita argues that "...the essence of industrial competitiveness is not price. It is the ability to make products that people want to buy."²⁷ Quality is a critical factor; many Japanese products continue to be purchased in the American market despite prices higher than similar domestic goods, because they are of higher quality. Examples include U.S. produced air conditioners whose failure rate is 500 times greater than those made by the Japanese, and American robots only capable of placing a part within 25 micrometers of where it belonged, as compared to Japanese robots with an accuracy of five micrometers.²⁸

MITI LEADERSHIP:

I believe that the best example of the leadership capability of MITI has been its ability to change its role as the situation dictates. During the immediate Post-war period, it was at the forefront of policy formulation. As time passed and as Japan's industries developed, MITI took less of a leadership role and became more of a facilitator and strategist. I believe its emphasis has changed from direct involvement to a monitoring of the business climate and to concentrating on strategic policy and industry development.

MITI realized the linkage between certain key industries and technology. It targeted industries with the broadest overall economic benefits. It identified the technologies of the future and encouraged industry involvement in these technologies. It realized that competitive pricing and quality are critical, and subsidized industry improvements in one form or another. It developed and utilized an information network to monitor foreign basic research, and stepped in to emphasize domestic commercial adaptation. Above all, it maintained a vision for government and industry and facilitated cooperation. MITI is the glue which holds the economic growth together.

MITI capitalized on Japan's cultural strengths, recognized the necessity of exports to survive, and utilized its own capacity to formulate industrial policy and direct strategic objectives. It synergistically combined conditions to drive Japan's dynamic economic growth.

JAPAN'S LESSONS:

The Japanese economy is considered a "plan rational" system due to the depth of government direction and control. Our current predominant political belief in the free market system and in minimum intervention by government would prohibit the creation of a MITI-type all powerful agency in the United States. Likewise, the cultural differences and existing anti-trust laws would limit the effectiveness of many of MITI's policies. What then can the United States learn from the MITI model?

The single most important lesson is the creation of a national industrial strategy. Currently, the closest thing to a coordinated U.S. policy comes from the Department of Defense. The pursuit of technologically advanced weapon systems has required DoD to initiate many actions which resemble a national industrial strategy; i.e., establishing R&D

laboratories, funding R&D projects, and nurturing defense industries. These efforts have succeeded in producing the most technologically advanced military in the world. Yet, overall, commercial industrial development has fallen to the point where the imbalance of trade is the largest ever and where our rate of economic growth has been declining. To a large degree, Japan's success has been due to a national policy for industrial development which targets specific industries having maximum linkages with other industries, develops fiscal incentives for industrial development, fosters R&D which leads to commercial application, develops incentives for educational training which favors technological advancement, and develops a nationwide incentive-based savings plan.

Another useful lesson is the coordination and mutual development of the policy with private industry. A technique utilized by MITI is the creation of policy forums with industry. This strategy would be an even stronger requirement for development of United States industrial policy. In Japan, MITI can use its "administrative guidance" and other pressure tactics to seek compliance. Policy implementation must be politically viable in the United States. The hierarchy of power in this country would be reversed with business probably the most powerful, followed by the politicians, and then the bureaucrats. Consensus for government involvement would be critical.

Establishing a communication network which would rapidly disseminate basic manufacturing technology, quality standards, management expertise, and foreign market opportunities to industry is essential. A striking success of MITI is its ability to serve as an informational service and to promote cooperation across Keiretsu boundaries.

In Japan, industry associations sometimes serve as the coordinating group between companies and as a funnel of information for discussion with MITI. The formation and use

of associations might be even more useful in the United States because of the prohibition of cartels, and thus, the extremely large number of companies involved in an industry.

Another element that should be explored is modification of our anti-trust laws. Both the Sherman and Clayton Antitrust Acts should be further reviewed to reduce the reluctance for joint research and production. Likewise, exceptions permitting vertical and horizontal integration of industries, where our international competitiveness is endangered, should be considered. Currently, these laws inhibit a number of firms from cooperating in a broad range of activities.

There are cultural magnifiers that have helped the Japanese execute their industrial policy. Our culture is different, but in many ways offers some strengths which could enhance our attainment of industrial growth. Americans have proven time and time again their ability to rally to a challenge. Provided the leadership and the problem recognition, we have always responded. Our less-structured lifestyles and our open markets can be a strong source of innovation and creativity. The freedom of the marketplace, given the goals, resources, incentives, and business opportunities, will respond. The challenge is to focus our efforts and to create a domestic industrial environment committed to economic growth in the marketplace.

GERMANY'S ECONOMIC MIRACLE

ELEMENTS FOR SUCCESS:

Germany, like Japan, has enjoyed economic success since the end of World War II. Between 1950 and 1978, overall industrial production increased at an annual rate of 6 percent with manufacturing increasing at an annual rate of 6.5 percent.²⁹ The average growth rate of their gross domestic product (GDP) during this period was at an annual rate of 5.3 percent. As a result, Germany's manufacturing was rapidly reintegrated into the world economy. The volume of exports expanded by 9 percent a year, which was considerably faster than the world trade in manufacturing over this period.³⁰ In 1990, Germany led the world in per capita exports, exceeding Japanese exports by 2.5 times.³¹ Unlike Japanese exports which are dependent upon a few industries and markets, Germany's exports are spread widely among many industries, firms, and nations. The reuniting of Germany has undoubtedly created a temporary financial burden. But based on previous experience of German industrial growth, this burden will be quickly overcome. The realization of a single European market and of Germany's close ties to eastern Europe hold great promise for continued economic prosperity.

What elements have contributed to German's economic success? How are German efforts similar to and different from those made by the Japanese? What can the United States learn from their successes? Like Japan, the miracle can be credited to a number of elements. I believe Germany's success centers around the following:

- Recognizing the need to maintain a strong export orientation to achieve economic success.

- Maintaining a cooperative relationship among government, industry, and labor.
- Ensuring a financial climate that encourages capital investment and a close relationship between banks and industry.
- Utilizing government initiatives to support research and development.
- Maintaining a government policy which supports national savings and education, and is oriented towards industrial growth.

EXPORT MARKET ORIENTATION:

Germans, in both the public and private sector, think export instinctively. The evidence supports this export orientation: 62 percent of their automobile production is for export, as is 60 percent of their machine tools, and more than 50 percent of their chemical production.³² In a 1986 Wall Street Journal editorial, Peter Drucker surmised that the chief element which set the Germans apart from the majority of industrialized nations was the export orientation of their managers, labor, and government.³³ The economic survival of their country has created this common goal. Like Japan, the need to import large quantities of oil has sparked this need to maintain a strong export market. In addition, limited by the size of their domestic market, Germany's overall economic health depends on exports. Products manufactured for export represent about half of German manufacturing output; in the United States the comparable figure is less than 10 percent.³⁴

Government has played an important role in support of industrial growth. However, industrial policy in Germany isn't as sharply defined or centrally controlled as in Japan. Perhaps the reason for this is the form of government in Germany. The central government shares power with the state (Lander) and local governments. Economic and

political power is diffused within Germany. The state and local authorities are fiscally independent from the federal government. They account for more than four-fifths of public investment. Thus, the ability of the federal government to exercise overall economic control is somewhat limited. Furthermore, the economic power of the state government is reinforced by the rule that the Bundesrat -- the second house of the West German Parliament, which is made up of representatives of state governments -- has to agree with all major actions of federal economic policy.

In addition, each bill concerning economic policy must be submitted to interest group associations for their comments before any government action. As a result of this consultation, in the form of intensive written and oral contact between the ministries and associations, bills often undergo substantial change before becoming law.

However, the recognition of the need to maintain the export orientation and the realization that "we are all in it together" helps build consensus towards a unified industrial policy. No law forces companies to respect government policy when developing their strategic plan. That most do respect such policy shows consensus among leaders in government, industry, and labor to work closely to protect the economic strength of their nation.³⁵

GOVERNMENT INVOLVEMENT IN THE MARKETPLACE:

Federal government policy implementation has historically taken the form of direct subsidies, tax relief, special depreciation allowances, and loan credits at preferential terms.³⁶ The majority of the subsidies have been to declining industries (coal, steel, shipbuilding, and shipping). The Ministry for Research and Technology tends to play the role more

attributable to Ministry of Industry in other countries.³⁷ R&D Levels in Germany have continued to grow at a steady rate, although not as quickly as in Japan.

R&D expenditures in the business sector:
percentage change from preceding year³⁸

	<u>73-81</u>	<u>81-85</u>	<u>85-89</u>
Germany	6.2	5.5	4.3
Japan	8.6	11.6	7.4
United States	5.2	6.5	2.0

Government R&D in Germany takes the form of grants for wages, investment premiums, provision of risk venture capital for innovation, and improved information services for technological development and export opportunities.³⁹ These public expenditures are aimed at improving the commercialization of products and toward developing technology. Again, there is the recognition that technological development requires risk-sharing with government. State and local governments support industry primarily through loan guarantees.

Germany has realized the importance of R&D spending for development of high-technology products. Despite an economic recession in 1978-82, expenditures for R&D increased during this period. Germany had experienced a loss of export shares in high technology from 1978-81. The subsequent economic recovery was marked by an above-average increase in their share of high-technology exports. This recovery reinforced Germany's commitment to continue innovative activities during a recession and to stick to longer-term technological strategies.

ROLE OF BANKS:

A striking similarity between Japanese and German industrial structure is the role of the banks. Like the Japanese banks, German banks hold substantial amounts of company stock and participate in establishing company policies. Many banks have representatives on the companies' supervisory boards. This provides for a long-term relationship between finance and industry. According to a study published by the University of Sussex European Research Centre, almost all of Germany's 100 largest companies have bank representatives on their supervisory boards, and in many cases these representatives chair the supervisory boards.⁴⁰ The three largest German banks (Dresdner Bank, Deutschebank, and Commerzbank) account for much of the banking system's influence over the larger industrial enterprises. This bank-industry relationship has helped foster a long-term outlook by industry. In one instance, the Deutschebank stepped in and purchased over 25 percent of the equity capital of Daimler Benz to prevent the shares from falling into the hands of a foreign company.⁴¹ The primary difference between Japanese and German bank involvement in industry is found in the nature of their ownership. Japan's source of control stems from the central, government bank, and then through the private banks to the companies. German involvement is based primarily on a small group of major, private-sector institutions. But in both instances, close cooperation exists between the sources of finance and industry and seems to foster longer-term business strategies.

LABOR COOPERATION:

Another strong similarity to the Japanese success story lies in Germany's successful labor relations. In 1983, Germany lost forty-one thousand days to strikes. The United States lost more than 17.5 million days the same year. The German worker enjoys 39 days

of holidays and vacation per year (23 is the U.S. norm). The work week is the world's shortest at 38 hours. The Germans work 450 hours less a year than the Japanese and 200 hours less than the Americans.⁴² This means that German industry must have high productivity to maintain the German standard of living and that it must look at high value added niches in the global marketplace.

This labor harmony is highlighted not only by a strong national commitment to a common goal, but also by a cooperative structure. German workers are represented on the supervisory boards (Boards of Directors) of almost all major companies. Thus, the supervisory boards contain management, banking interests, and employee representatives. All information concerning the direction of business activities is discussed and consensus is reached. This atmosphere encourages cooperation and commitment. It also reinforces the development of longer-term strategies and the willingness to accept lower profit margins and return on capital.

COMMITMENT TO QUALITY:

The Germans, like the Japanese, do not invest heavily in pure research. They have not pursued leading-edge technology development to the same extent as the Japanese. But they offset this technological deficit by striving for a superior quality product and by concentrating on technological application. In Germany, the concern is to develop the skills of their managers and workers, to emphasize the importance of incremental technical advances, to seek long-term customer relations based on product quality and reliability, and to establish conditions under which workers can actively participate in improving manufacturing systems.⁴³

The makeup of the German industrial sector is different than Japan's. In Japan, the export industry is led by the relatively few, but large, Keiretsu organizations supported by many larger companies. The "global 1000" as published by Business Week contains 353 American company names, 345 Japanese companies, and only 30 German. German industry is led by some 15,000 medium-sized firms of which 9000 are in manufacturing.⁴⁴ These firms account for most of the production and export and revenues -- and provide global customers with flexibility in product adaptation. Many of their export. are one of a kind.

WORKFORCE TRAINING:

Technical competency of their workforce has been the basis for development of Germany's industrial growth. The Germans have an extensive apprenticeship program. Under this system, more than half of their youths leave full-time school by the age of sixteen to enter three years of apprenticeship. They spend two to three days a week on the job in their chosen trade. Another two to three days per week are spent in a state-run vocational school studying a curriculum which is regulated by the state and by trade associations. The apprenticeship programs contain over 450 job classifications.⁴⁵ These programs produce highly skilled workers in fields from banking to machine tool operations. German workers have achieved a high broad skill level when they join companies at the completion of this program. One result is that flexible manufacturing systems are more readily implemented in Germany.⁴⁶ Would-be apprentices bring a highly technical background with them. Students encounter biology in the third grade, physics and chemistry in the fifth, and, for those preparing for college, increasingly advanced math and

science courses each year. The number of engineers per 100,000 people in Germany exceeds the number of engineers in the United States per 100,000 by fifty percent.⁴⁷

GERMANY'S LESSON:

The German economy is not as formally controlled as the Japanese. Yet, its industrial policy has been developed through a combination of compulsory actions and business/government consultations. There also is an informal, but pervasive, understanding between business and government leaders concerning economic development. Equally important is the involvement and influence of labor in decisionmaking. Cooperation and consensus building have resulted in a relative state of labor harmony, in improved quality, and in commitment to decisions.

The American Embassy reported in 1980 that the business/government ties confirm the wisdom of consultation and consensus as an approach to policy development.

"Leaders of government, business, and labor believe that their close, across the board cooperation has played a key role in German prosperity. It is true that the government is basically committed to the free market and rejects much of the sort of government participation in the economy...which one finds in many of the other European Community countries. But...government plays a most important role..., and works much more closely and cooperatively with the private sector of the economy than does the U.S government."⁴⁸

Germany, through self-initiative and with the support of its government, has developed market niches that have capitalized on quality and customer satisfaction. They have utilized their understanding of what it takes to maintain an export driven economy. They have combined a common sense of purpose, worker training, long-term perspective, savings, and a penchant for quality, with a complete understanding of human involvement, to recapture and sustain a strong economic growth. With the reunification of West and East Germany, the pending Europe 92, and their proximity to Eastern Europe and the

Russian commonwealth, they are ideally situated to maintain their economic strength into the twenty-first century.

TIME TO REVIEW INDUSTRIAL STRATEGY

While the United States and the Soviet Union were engaged in the Cold War, the world has changed. It is increasingly economically interdependent. This interdependency must continue if peace and prosperity are to be shared by all the world's members. Eastern Europe and the nation-states of the Soviet Commonwealth, along with the developing Third World countries, must share in global economic growth if their experiment in the free market and democracy is to continue.

The United States has long been perceived as the marketplace of the world. Its large economy and relatively open borders have provided an opportunity for developing countries to sell their products and to share in our prosperity. This has not been a problem as long as American industries were able to compete favorably at home and internationally and as long as domestic economic growth continued. But now American industry shows signs of weakness. In many important sectors of the economy, U.S. firms are losing ground to their competitors from abroad. According to one estimate, seventy percent of U.S. manufacturing output now faces foreign competition.⁴⁹

The MIT Commission on Industrial Productivity Studies concluded that the setbacks many firms have suffered are not merely random events or part of the normal process by which firms constantly come and go; they are symptoms of more systematic and pervasive ills.⁵⁰ They concluded that things will not be remedied simply by trying harder to do the same things that have failed to work in the past. The international business environment has changed irrevocably and the United States must adapt its practices to this new world.

THE LEVEL PLAYING FIELD:

We have heard numerous arguments that all that is needed for U.S. industry to become more competitive internationally is for other countries to provide a level playing field. But is this entirely possible or realistic? Let's look at the key elements of both Japanese and German industrial structure and review possible modifications to the playing field.

Japan has a more concise government mechanism for controlling industrial policy than Germany. MITI has been more directly involved in forming strategy and influencing government initiatives (whether fiscal or monetary policy) to direct and support industry. In so doing, it has capitalized on the nation's recognition that global trade is necessary for the nation's survival. The industrial structure it permitted to develop is the bank-centered Kereitsu. The intertwined relationships and the success it has enjoyed would require a national commitment to undo.

In Germany, government support is essential to many key industries. The Central Government's power is more diffused among the state governments than in Japan, making governmental reorientation more difficult. The national reliance on an export economy and the large number of medium-sized companies make policy changes even more difficult.

The Germans and the Japanese believe that global trade is necessary for their national survival. Their citizens have responded and have seen economic success. Changes in public policy or in industrial structures in either of these countries would threaten their economic cohesion, and thus be perceived as a loss for their international competitiveness. Although some changes helpful to U.S. exports might be attainable, the amount of restructuring necessary would not be politically acceptable within these countries. Why

should they sacrifice their standard of living to accommodate what is thought to be a U.S. problem? The political leaders of both Japan and Germany and those of other industrial countries would personally feel the political consequences of any action perceived to be a threat to their country's standard of living.

There is another reason that the United States will be less successful in influencing change in other countries. Much of our ability to influence the Western world was essentially due to the East-West conflict. Today, the Western allies no longer depend on the United States for survival; so they have less need to defer to our wishes.

We have talked for a long time about a more balanced playing field. But where is the field? The largest single market of opportunity in the world has been the United States. Countries, especially those with a limited domestic market, will always want to play on our field. While our National Security Strategy has concentrated on keeping the former Soviet Union engaged in foreign battlefields, the economic battle has been waged in our marketplace. Our trading borders have remained open for foreign producers to sell their products on our field. An instinctive reflex is to close those borders through protectionist policy and to allow our domestic industries to recover their once exclusive homefield advantage. But, a deeper analysis should reflect on why United States firms have become less competitive in their own backyard. If U.S. customers view our products as having inferior value, why should foreign customers conclude differently? If U.S. industries are to compete globally, shouldn't they be able to at least win the majority of their skirmishes on their playing field? But, performing better on the homefield is not the only need.

The increased interdependence in the global economic area and the increased importance of economic versus military power will impact the United States' world

leadership role. We must maintain economic growth so that we can keep our domestic markets open to the world's developing countries. Shared growth is the key to world peace.

The best way for the U.S. to obtain a level playing field is to work with its industries and with labor to make our products more competitive. The Japanese and Germans have shown that a cooperative environment -- regardless of the level of government intervention -- has enhanced their industrial strength in the global marketplace. Our government must gear its industrial strategy toward a realistic approach that all countries will act in their own self-interest. First, we must help ourselves become more competitive in the marketplace. As we show an ability to recapture markets, structural changes may then be perceived to be in everyone's best interest, not just the United States.

What, then, should the changes look like? What are the elements of Japanese and German industrial policy that increase their competitiveness? Which elements can help U.S. industry? And finally, what role should government, industry, and labor play in this revitalization?

GOVERNMENT LEADERSHIP IS NECESSARY:

Our ability to influence foreign governments to modify their support for domestic industries is limited. Likewise, our ability to intercede in our own domestic market has limited political acceptability. How then can our government initiate revitalization of our industrial base? The Japanese and German models would suggest that our industries need some help to become more competitive in the international marketplace. Government has an important role to play. It must continue to try to reduce trade barriers and other forms of protectionism. But, more importantly, it must also provide the leadership and vision to initiate the refocusing of American industry.

There should be no question that industry and labor must bear the largest burden if we are to increase our competitiveness. We must increase the quality and value of the products we produce. But can they do it alone? Our industries are facing foreign competition which receive substantial amounts of government support. This support is directed, well coordinated, and aimed at the export marketplace. Besides various forms of domestic subsidies, both Germany and Japan distribute foreign aid aimed at expanding their export markets.

Japan, in granting aid to Thailand, included the provision for the purchase of Japanese manufactured products.⁵¹ Germany has extended aid to Eastern Europe and to the Russian Commonwealth with the purpose of developing expanded markets.⁵² The Airbus consortium has received assistance from both France and Germany offering potential customers low interest loans.⁵³

Japan and Germany provide government subsidies and direction to ensure that their industries have access to a well trained workforce. In both of the countries, government policies influence savings and capital available for investment.

Japan and Germany's governments provide the vision and export orientation to focus their industries. They encourage and support their industries in developing long-term business strategies.

American products must compete in the global marketplace against products that were developed and produced with increasing amounts of value added by foreign governments. Likewise, American industries are subject to the availability of human and financial resources that, to a large extent, are more influenced by government policy than by industrial choice.

The duty of government is to provide for the people what they cannot otherwise provide for themselves. National security has been the common bond which brought consensus to our political system. The changing world environment has elevated economic vitality to the key component of national security. Without financial resources, political and military choices are limited. One has to look no further than to the financing of the Gulf War, or to our inability to increase funding to the Russian Commonwealth, or to our inability to counter Japan's aid in Southeast Asia to see the limitations caused by lack of resources.

It isn't an issue of whether government should assist industry in the marketplace. It is whether our government can afford not to create an environment which will ensure industrially led economic growth. Our industries are disadvantaged without government support at least equal to that received by their competitors. Our national security interests cannot be met if we don't have the financial resources necessary to make decisions in our own best interests.

Perhaps it is not just our industries that need to regain their competitiveness, but also our government. As I mentioned previously, industrial policy comes in many forms. A government directed policy would undoubtedly incur political and industrial resistance. The key nonetheless is for government to create the environment conducive to cooperation and growth.

For government to be effective in making industry more competitive, industry must agree on the form of government assistance in the marketplace. Likewise, if government is to be successful in implementing an effective program, it must have labor and industry support and political consensus. It must also have a central agency to coordinate the efforts

and to gain the political support from Congress and the Administration. Before telling industry what it must do, government representatives must listen to the needs of industry and labor.

Both the Japanese and the Germans have shown an ability to define a national purpose and to reach consensus with their populations on the method and the need to have a strong industrial base. Our government must ensure that the problem and threat have been recognized and that a forum is developed to define the roles and the strategy. A government-directed effort without the acceptance of industry and labor will be wasted. Laws and federal programs provide incentives or disincentives and impact the economic environment for private sector activities. But the fact remains that while actions of the federal government, or those it fails to take, affect the business community, laws cannot force individual firms to be competitive.

The Japanese provided a valuable lesson in how government can start the process of revitalizing the industrial base. They initiated meetings with industrial representatives and established consensus on the role government should play in the rebuilding. We can and should do the same. We should start by identifying the key sectors of our economy in which we either need to build the industrial capacity or in which we have a comparative advantage. We should ask industries to meet and to form associations -- many industries already have these associations -- to represent their sectors in meetings with government representatives. Labor representatives from the industries must also be part of the industrial teams.

The Federal government should take the lead in arranging the meetings and in coordinating all government support. But state governments must be part of the consensus

building and should have representatives at the industry meetings. Members of Congress must also be part of the government team. The Federal government must reach agreement on its representatives for the meetings with industry.

A single organization should be established to coordinate government actions. This could be accomplished by reorganizing existing cabinet level agencies or by establishing a quasi-government agency. The make-up of the organization should isolate it as much as possible from political intervention. Many of the policies necessary to help American industry are now in place. The problem is that they are uncoordinated, individual actions. The Council on Competitiveness reported that present policies are piecemeal, ad hoc, and inconsistent. There is far too little coordination within the federal bureaucracy and among the federal agencies, the states, and the private sector.

Areas to be discussed in the government-industry-labor forums include capital formation, industry-industry cooperation, infrastructure support, long-term decision strategies, human resources, research and development, government and private labs, information exchange, and government financial support and regulations. The following topics should serve as a framework for these discussions.

CAPITAL MUST BE AVAILABLE:

Japanese and German banks hold equity interests in major industrial companies in their countries. This results in agreement and support between the sources of finance and in the direction of business activities. As a result, business strategies are developed for a longer term. Banks have a better understanding of the business and are more likely to make capital available if the business plan is sound. The banking laws in the U.S. prohibit banks from having equity interests in our companies. Changing these laws should be a

topic for consideration. Establishing a public merchant bank should also be considered. The United States used to have a public investment bank -- the Reconstruction Finance Corporation.⁵⁴ This Corporation was abolished in 1953, but many of its activities were dispersed to the Small Business Administration, the Export-Import Bank, the Federal Mortgage Association, and the Commodity Credit Corporation.⁵⁵ Placing these in one institution would be a more effective means of insuring that funds were available where needed.

A national savings plan implemented for investments in industrial growth should be considered. Special tax incentives for saving or for consumption taxes could be used to provide the necessary capital.

INDUSTRIES MUST COOPERATE:

Japanese and German industries are ingrained with a sense of purpose. They realize that their national and industrial survival depend upon competing successfully in the global market. As such, their industries are more supportive of each other for purchasing preference, for joint developments, for technological exchange, and for cooperating on research and development projects. Our antitrust laws now permit some forms of joint research, but limit cooperation in production if it would lessen competition. To compete in the international market, companies might have to combine resources. The laws should be reviewed to adjust for the changing world marketplace. United States industries must be encouraged to help each other and to develop a national sense of purpose. Japanese and German firms have demonstrated that long-term relationships with suppliers have been more successful for increasing competitiveness than relying on price alone. Quality and

reliability have improved, and in many cases, costs have been reduced. Cooperative relationships have increased competitiveness.

Our industries have developed a conditioned response which inhibits them from cooperating with each other. Antitrust laws and government enforcement are responsible for maintaining this behavioral pattern. Government action will be required to create a cooperative environment.

AN EFFICIENT INFRASTRUCTURE IS REQUIRED:

Government must ensure the availability of sufficient quantities of low cost energy, of an efficient transportation system, of adequate water and sewer systems, of effective industrial waste-disposal means, and of an efficient communications network if our industries are to be competitive. These services are subsidized in one form or another by most countries. The trend in the United States has been to transfer the costs for these services from the public sector to industry. Many of these transfers have been in the form of user fees, in conditions for the issuance of building permits, or in other regulations. Industry and government must discuss the appropriate sharing of these costs and the need for improved services to ensure efficient use of public funds.

The domestic transportation network and the means of shipping products must be competitive with other countries. Likewise, the workforce must be efficiently transported to and from work. Energy savings, environmental concerns, quality of life, and efficient use of natural resources all depend on a smooth running transportation system. Costs associated with providing these services to new manufacturing plants must not create a burden on competitiveness. Costs and availability of a quality workforce, power, water,

sewer, and communications all impact on business decisions and are ultimately included in the cost of products.

COMPANIES MUST DEVELOP LONG-TERM STRATEGIES:

Japanese firms maintain a long-term vision oriented towards growth and market share. Intertwined ownership between companies and banks provides stability which allows the firms to make decisions oriented towards long-term rather than short-term profit motives. German firms, due to the type of ownership and their commitment to a national purpose, are also encouraged by their investors to make longer-term decisions. United States companies, due to their stock equity ownership, frequently must make decisions which maximize profits in the short run. This often restricts their ability to invest in capital improvements and R&D. Structural means of changing this decision process should be explored by industry and government teams. Modifying the tax structure to eliminate capital gains tax if an investment is held for five years might be one method to achieve this goal. Leveraged buyouts and other forms of financial transactions not intended for increasing productivity or for increasing competitive position should be restricted. An industrial climate oriented towards long-term growth must be maintained.

QUALITY DEPENDS ON HUMAN RESOURCES:

With their total quality-management philosophy, the Japanese have gained wide recognition for producing quality projects. Their commitment to continuous product improvement is evident in the marketplace. The belief in the quality of their products has been the most important aspect of their economic growth. It should not be surprising to learn that there is a similar commitment on the part of the German workforce. The

literature review turned up many of the same descriptive phrases on quality, customer orientation, technical ability of their workforce, and team consensus building in their factories. Many U.S. firms have initiated quality improvement programs. However, the program itself, without a highly trained workforce committed to a common purpose, will have limited effectiveness.

Japan uses company training as their vehicle for upgrading the technical skills of their workforce. Germany relies on their apprentice program. The declining effectiveness of the American educational system is perhaps the largest long-term threat to American industry. This must be addressed. However, educational improvement won't help industry for some time to come. Eighty-five percent of America's workforce for the year 2000 is already in the workplace.⁵⁶ Improving schools for today's and tomorrow's students is not enough to assure a competitive America by the year 2000. Government support for more company-based training, perhaps through tax credits, must be explored. Government could also play a role in encouraging more students to become engineers and scientists and in expanding the number of universities which develop manufacturing technology.

New institutional plans also will be needed to make affordable training available to small businesses. The Congressional Office of Technology Assessment proposed the following: industry training consortia, training partnerships with community colleges and other training providers, involvement of industry associations in training, and joint labor-management training programs.⁵⁷ These all should be considered.

Technological advances can increase a product's quality and reduce costs. Recent research has also shown that the application of technology creates more jobs than those that are lost.⁵⁸ Even when jobs are lost to automation, new ones are created at companies

manufacturing robots and processors, at software companies, and at companies making the parts for the computers.

However, technological development changes the types of jobs available and requires new and different skills. Retraining of existing employees is essential. The continuing creation of new jobs which demand a high level of expertise will result in a gap between the abilities of the workforce and available positions. One demographic trend indicates that by the year 2000 the total number of new employees will decline and that the pool of potential employees will be less educated and less trained to meet the job requirements.⁵⁰ This doesn't bode well for our future competitiveness. If we are going to increase the application of technology to increase our competitiveness -- and I believe we must -- it will require increased training and retraining of our workforce.

Both Germany and Japan have a well trained workforce that is oriented towards accepting greater responsibility for their product and for the manufacturing process. Their companies treat investment in human capital with the same or more zeal as their investments in equipment. They have realized that flexibility and broad knowledge of the entire manufacturing process is necessary to incorporate technological advances. This involvement in creating and maintaining the production process has created ownership of the product in the workforce and has resulted in quality improvements. By increasing the process-oriented training, by increasing the responsibility of the production worker, and by rethinking our management approach to quality and customers, we can meet the challenge.

Industry and labor must also work together to develop an industry environment which rewards workers more equitably and which develops a common sense of purpose to improve the quality of American products. Our success in developing human resources and

in committing ourselves to global competition will ultimately determine our success in the international marketplace.

GOVERNMENT ASSISTANCE FOR RESEARCH AND DEVELOPMENT HELPS:

Both German and Japan are more process-improvement oriented than new-product oriented with their R&D investment. They believe that improving the quality of their product and producing it more efficiently will pay larger dividends in market share and in customer commitment. Government-industry cooperation in identifying areas for research is extremely important for ensuring that limited resources are used effectively. Government could provide resources and concentrate research to help industry in critical areas. But perhaps the most important government assistance could be in creating the means and environment to facilitate sharing of results both within and between industrial sectors. Some recent legislation is helping in both these areas. Federal funds have been provided for a joint semiconductor research effort with the private sector, SEMATECH.⁶⁰ Also funded is the superconductivity initiative encouraging joint R&D between federal laboratories and private firms aimed at commercialization. Legislation has also been approved encouraging joint research among private firms, universities, and federal labs. Tax credits and patent incentives have been used to encourage industries. But, R&D covers only about 25 percent of the commercialization cost of technological innovations.⁶¹ Additional incentives in the form of capital investment tax credits will probably be required to encourage firms to assume the production risks.

According to the MIT study, our government is poorly organized to adapt a technology policy for commercial application. Responsibility for technology is dispersed widely throughout the Executive Branch and Congress. No fewer than twelve federal

agencies have responsibility for research and development. The responsibility for the Federal science budget is shared by nine of the thirteen appropriation subcommittees.⁶² If we are to coordinate the commercial application of government R&D expenditures effectively, a central agency should be utilized.

The Defense Department has led the way in promoting research and development. Most of their efforts have been pointed towards defense applications. These have resulted in some "spin-offs" for the commercial sector. The future strength of our defense industrial base will be closely tied to our commercial sector and how well it competes in the global market. The Defense Department must revise its thinking to ensure that projects chosen for research and development have commercial application. The best weapons system in the world will have little meaning if the capability and technology to develop it at a reasonable cost does not exist, or if the economic condition of our country does not allow us to pay for it.

GOVERNMENT AND PRIVATE LABS CAN ALSO HELP:

Currently, there are over 700 government laboratories accomplishing research under the direction of seven government agencies. Increased efforts must be made to coordinate research and to share results. There have been recent attempts to encourage private companies to use the talent of these laboratories by sharing technology and project information. Much more is possible. Industries must have a greater knowledge of the capabilities and experience found in these laboratories. Likewise, some portion of the laboratory research should be oriented towards commercialization of the results. Laboratories oriented strictly towards manufacturing processes should be considered.

Private laboratories usually exist in conjunction with major universities. Japan and Germany have made use of the concept of Technology Centers. Government policy encourages corporations to establish production centers near research and academic centers. The synergy created by research and production being co-located has produced technological gains and has also provided a magnet atmosphere which attracts better people and more industries.

One of the major strengths of the United States is its leadership in pure research. Encouraging industries to co-locate near these research centers would encourage the commercialization of the research products.

INFORMATION EXCHANGE WILL BE REQUIRED:

Information technology is rapidly changing. Government must ensure that our infrastructure is developed to maximize the benefits of the technology. The global marketplace, with the increasing number of free-market economies, will require an improved information network which will rapidly communicate market opportunities and product needs.

The successful industries of the future will require a totally flexible production system. The evolving industrial countries will demand products that have different features. Companies competing in this environment must be capable of quickly receiving the product requirements and then producing a high-quality product faster than a competitor. A responsive information system will be essential for competitiveness.

An equal concern is establishing a means and an attitude which will facilitate technology and market cooperation among government, industries, and research centers. Getting the edge on a competitor in the global market requires that you extend

technological limits faster than the competition. An industry's right to proprietary information must be protected, but a means for industries to help one another in the global marketplace must also be established. Industry/Government meetings must explore possible mechanisms to improve the information exchange. The Japanese development of interface standards between the electronic controls and the machine tool manufacturers is a good example. Government and industry established the interface standards which allowed Japanese producers to get a head start on the market and virtually to eliminate the competition from United States' industry.

GOVERNMENT FINANCIAL SUPPORT AND REVIEW OF REGULATIONS IS NEEDED:

The most controversial area of government involvement in the marketplace is direct financial involvement. The industry/government forum should provide a framework and establish a basis for consensus. The Japanese have realized that the commercial risk of developing new technologies places a heavy burden on private companies, and that without some risk-sharing by government these technologies wouldn't have been quickly commercialized. Yet, Japan has not pushed technology by having government offer to pay all the costs. They realized the efficiency of the marketplace and required commercial concerns to put forth two-thirds of the research and development costs for commercial product adaptation. They have also used government credit guarantees and other innovative approaches, i.e. renting robots, to encourage commercial adaptation of technologically risky products. Germany and other E.C. countries have also provided funds for research and production subsidies for the commercial development of Airbus.

The Japanese permit higher prices for domestic products to help exporting firms sell their exports at lower costs, and thus increase their global competitiveness. This is possible in Japan because of their loyalty to Japanese products, the belief that Japanese products are of higher quality, and the difficulty experienced by foreign manufacturers in entering the retail distribution system in Japan. This form of subsidy will not work in our open market system unless our domestically produced products are perceived to be of higher quality. Our strategy must include other forms of assistance to reduce costs and to improve quality.

Government involvement in underwriting costs or in providing subsidies will almost certainly bring forth an accusation that it is directly or indirectly picking "winners and losers." The political danger is enormous. Consensus with industry and within government will be essential. But if we are to level the playing field, government-supported value added to our products of industry must be comparable to that of our competitors.

An immediate infusion of tax writeoffs for equipment and for human investment may be necessary to accelerate the revitalization. But, government involvement should be planned and agreed upon for the long term. If government support is limited to annual approval, it will not achieve the desired result. Only with the longer time frame will industry be able to develop their strategic plans. Government commitments should be for a minimum specified duration.

A mechanism must be established to evaluate the regulatory impact on industrial development. Health, environmental, and other social costs imposed on industry increase product costs and detract from our international competitiveness. Some of these costs must be borne by the producer to ensure market efficiency and environmental sensitivity. But

those which could impact on global competitiveness should be funded by other means. The industry-government-labor forum should review the social and economic impacts of these costs.

THE OPPORTUNITY IS OURS!

Our national security strategy for the year 2000 must put industrial revitalization as our number one goal. Our ability to influence the course of world events will be measured by how we address this challenge. Economic growth will depend on how our products compete in the domestic and global marketplace.

Without a growing economy, we won't be able to solve many of our domestic problems -- education, national healthcare, economic inequities, and infrastructure needs. Our failure to solve these needs will further weaken our national unity and social cohesion. We must stay engaged in the world economic and political domain. We have encouraged others to follow our free-market concept and democratic way of government. We have maintained that this is the way to ensure prosperity and peace. Our ability to continue to influence others to pursue peaceful economic-based gains for themselves must include keeping our markets open for them. We must all be able to grow together in the world economic community. I believe the world needs a strong United States economy. With the strength gained from a strong economy, we will be able to provide leadership and assistance in mutually solving the world's problems.

Our military power depends on our ability to reconstitute our defense production in time of need. The credibility of our military force as a deterrent will depend on our success at revitalizing our industrial base. A strong, growing economy and a technologically advanced industrial sector must exist if we are to maintain our defensive ability. Industry

that has the flexibility in technology, equipment, and workforce to modify production rapidly for military equipment manufacture is necessary. An industrial base which is innovative and at the leading edge of technology is required to compete in the global market and to provide adequate defense mobilization capability.

Our revitalization strategy must be based on increased government cooperation with industry and labor. We must create a coordinated governmental strategy where policies will promote commercial technological development and application as a component of economic growth. We must seek a means to establish a nationwide recognition of the importance of industrial development and technology. We must use this recognition to build consensus of purpose and to establish an environment for cooperation among labor, industry, and government to increase the competitiveness of our products in quality and cost. We must revitalize our industries and secure the economic growth necessary to meet our domestic needs and to carry out our international responsibilities.

Our strategy must recognize the sovereignty of all nations of the world. We cannot expect the rest of the world to change their domestic policies to accommodate our concept of a level playing field. We must work together to meet the challenges at home. American industry must be able to provide products that meet the market test of quality and cost. Government must help industry recreate an environment which once again is highlighted by innovative growth. The continuance of the American Dream depends on it!

ENDNOTES

1. Michael L. Dertouzos, Richard K. Lester, and Robert M. Solow, Made in America - Regaining the Productive Edge (New York: Harper Collins, 1990), p. 111.
2. William J. Baumol and Alan S. Blinder, Economics, Principles, and Policies, 5th ed. (Harcourt Brace Jovanovich, 1991), p. 298.
3. Robert J. Gordon, Macroeconomics, 4th ed. (Boston: Little Brown, 1987), Table B1, updated.
4. Bela Balassa and Marcos Noland, Japan in the World Economy (Washington, D.C.: Institute for International Economics, 1988), p. 4.
5. Germany Country Report and Japan Country Report, the Economist Intelligence Unit (London: Business International Limited, 1991), No. 3, p. 3.
6. Robert Z. Lawrence, "Innovation and Trade: Meeting the Foreign Challenge," Setting National Priorities: Policy for the Nineties, ed. Henry J. Aaron (Washington, D.C.: The Brookings Institution, 1990), p. 148.
7. Suzanne Berger, Michael L. Dertouzos, Richard K. Lester, Robert M. Solow, and Lester C. Thurow, "Toward a New Industrial America," Scientific American (June, 1989), Volume 260, Number 6, pp. 39-47.
8. "The Defense Industrial Base, Lifeline Adrift," report by the Air Force Association (Arlington: Aerospace Education Foundation, Sept. 1991), p. 1.
9. Peter P. Belch, Irene Kyriakopoulos, Ellen V. McCauley, and Herman O. Stekler, "An Ailing Defense Industrial Base: Myth or Misconception?", Defense Management Journal (3rd Quarter, 1986), p. 37.
10. "Foreign Industrial Targeting and Its Effects on United States Industries, Phase 1 -- Japan," report by the United States International Trade Commission (Washington, D.C.: U.S. Government Printing Office, 1983), entire.
11. Clyde V. Prestowitz, Jr., Trading Places (New York: Basic Books, Inc., 1988), p. 13.
12. Ministry of International Trade and Industry, Trends and Future Tasks in Industrial Technology (Japan: MITI, Sept. 1988), p. 1.
13. Andrew Tanzer, "There is a Sense of Running the Country," Forbes (April, 1990), p. 202.

14. Daniel I. Okimoto, "Regime Characteristics of Japanese Policy," Japan's High Technology Industries, ed. Hugh Patrick (Seattle: University of Washington Press, 1986), pp. 35-96.
15. "U.S. Japanese Survey Shows Higher Prices There Than Here," Business America (Feb. 12, 1990), p. 35.
16. Andrew Tanzer, "World's Worst Oil Policy," Forbes (July 24, 1989), p. 245.
17. David Sanger, "Japan Keeps Up the Big Spending to Maintain Industrial Might," The New York Times (April 11, 1990), p. A1.
18. "Japan Keeps up the Big Spending to Maintain its Industrial Might," New York Times (April 11, 1990), p. 1.
19. George C. Eads and Richard R. Nelson, "Japanese High Technology Policy: What Lessons for the United States?", Japan's High Technology Industries, ed. Hugh Patrick (Seattle: University of Washington Press, 1986), pp. 243-270.
20. Lester Thurow, The Zero-sum Solution (New York: Simon and Schuster, 1985), p. 279.
21. Chalmers Johnson, MITI and the Japanese Miracle (Stanford: Stanford University Press, 1982), p. 108.
22. Ibid., pp. 246-74.
23. Balassa and Noland, p. 8.
24. Bruce R. Scott, "Can Industry Survive the Welfare State?", Harvard Business Review (Sept./Oct. 1982), p. 74.
25. "Whatever Happened to Savings?", The Economist (Feb. 3, 1990), p. 13.
26. Eads and Nelson, p. 250.
27. "Sony CEO Scolds U.S. Companies," New Technology Week (June 20, 1988), p. 12.
28. Lester C. Thurow, "A Weakness in Process," Technology Science (Dec. 18, 1987), p. 166.
29. Jurgen B. Donges, "Industrial Policies in an Open Advanced Economy," paper presented at the Symposium on Industrial Policies of 1980's (Madrid, Spain), sponsored by Organization for Economic Cooperation and Development, May 5-9, 1980.
30. Jurgen B. Donges, "Industrial Policies in West Germany's not so Market-oriented Economy," The World Economy (Sept. 1980), p. 186.

31. Tom Peters, "The German Economic Miracle Nobody Knows," Across the Board (April, 1990), p. 17.
32. Germany Country Report, The Economist Intelligence Unit (London: Business International Limited, 1991), No. 3, p. 21.
33. Peter Drucker, editorial: "What We Can Learn From the Germans," The Wall Street Journal (March 6, 1986), p. 11.
34. Joseph A. Limprecht and Robert H. Hayes, "Germany's World-class Manufacturers," Harvard Business Review (Nov./Dec. 1982), p. 141.
35. Balassa and Noland, p. 143.
36. W. M. Corden, "Overall Assistance to German Industry," Public Assistance to Industry: Protection and Subsidies in Britain and Germany (London: Macmillan for the Trade Policy Research Centre, 1976), pp. 91-119.
37. Alexis Jacquemin, European Industry: Public Policy and Corporate Strategy (London: Clarendon Press, Oxford, 1984), p. 45.
38. Industrial Policy in OECD Countries. Annual Review 1991 (Paris: Organization for Economic Cooperation and Development, 1991), p. 101.
39. Ernst-Jurgen Horn, "Germany: A Market Led Process," Managing Industrial Change in Western Europe, ed. by Francis Duchene and Geoffrey Shepherd (London and New York: Frances Pinter, 1987), p. 70.
40. Jacquemin, p. 70.
41. Horn, p. 70.
42. Peters, p. 18.
43. Limprecht & Hayes, p. 137.
44. Peters, p. 20.
45. Limprecht and Hayes, p. 139.
46. Peters, p. 18.
47. Limprecht and Hayes, p. 144.
48. Franklin Delano Strier, "On Economic Planning, Japan and West Germany Have a Better Idea," The Center Magazine (Jan./Feb. 1984), p. 37.

49. U.S. Trade Performance in 1987, U.S. Department of Commerce, International Trade Administration (Washington, D.C.: U.S. Government Printing Office, 1988), p. 6.
50. Dertouzos, Lester, and Solow, p. 8.
51. James Mack, interview, The Association for Manufacturing Technology, Feb. 7, 1992.
52. Marc Fisher, "Eastern Europe Swept by German Influence," Washington Post (Feb. 16, 1992), p. 1.
53. Susan Carley, "U.S. Goes After Airbus' Unfair Practices," The Wall Street Journal (June 11, 1986), p. 32.
54. Celesta Gentry, "Federal Credit Programs: An Overview of Current Problems and Their Beginnings in Reconstruction Finance Corporation," Office of Corporate Finance, U.S. Treasury, August 1990.
55. Thurow, The Zero-sum Solution, p. 278.
56. America 2000. An Education Strategy Sourcebook (Washington, D.C.: U.S. Department of Education, 1991), p. 29.
57. Worker Training: Competing in the New International Economy (Washington, D.C.: Office of Technology Assessment, 1990), p. 27.
58. Technology and Employment, ed. Richard M. Cyert and David C. Mowery (Washington, D.C.: Academy Press), p. 41.
59. Workforce 2000. Work and Workers for the 21st Century, Hudson Institute (Washington, D.C.: U.S. Government Printing Office, June 1987), p. xxi.
60. Wendy Schacht, Cooperative R&D: Federal Efforts to Promote Industrial Competitiveness, CRS Brief (Washington, D.C.: Congressional Research Service, Library of Congress, December 18, 1991), p. CRS-7.
61. Wendy Schacht, Technology Transfer: Use of Federally Funded Research and Development, CRS Issue Brief (Washington, D.C.: Congressional Research Service, The Library of Congress, updated December 18, 1991), p. CRS-3.
62. Dertouzos, Lester, and Solow, p. 113.